



Skill India
कौशल भारत - कुशल भारत



N.S.D.C.
National
Skill Development
Corporation



SKILL GAP STUDY AND MANPOWER SURVEY FOR INDIAN IRON AND STEEL SECTOR SKILL COUNCIL



PREPARED BY
**NATIONAL INSTITUTE OF SECONDARY STEEL
TECHNOLOGY**

APPROACH AND METHODOLOGY (A&M)

➤ Categorization of Industry in terms of Sub-sectors of iron and steel industry

- ❖ BF-BOF route
- ❖ EAF route
- ❖ Induction Furnace route
- ❖ Sponge iron
- ❖ Rerolling sector

➤ For in depth study 4 states were selected:

- West Bengal
- Jharkhand
- Odisha
- Chhattisgarh

The four states contribute to 52% of steel production of the country and also has a right mixture of PSE – Steel Plants and Private Industry partners like Tata Steel, Bhushan (now Tata) and JSPL and has largest SME sector of the country

APPROACH AND METHODOLOGY

Principle used for manpower estimation

- a) NISST adopted strategic norms based on analysis carried out on the data collected from a wide variety of sources – representatives of companies active in the segment, industry experts and targeted research reports.
- b) Manpower employed for producing per MT of crude steel produced in different sector
- c) Direct Interview with Production and HR of sample selected plants
- d) Norms helped link the required data point i.e. the number of employees with high-level statistics (such as annual revenue, annual production, etc.)

This given the figure of present mappable manpower presently engaged

APPROACH AND METHODOLOGY

Approach to estimate future employment generation

- a) Estimation of Current jobs in industry
- b) Estimated growth
- c) HR Based inputs
- d) Estimate industry growth over the next 10 years taking National Steel Policy 2017 as standard
- e) Understand future employee numbers & the expected job creation trend in the organisation
- f) Extrapolation of the job addition trend to the entire universe of companies

OUTCOMES FROM STATE LEVEL STUDY

- Demand & Supply Side of manpower
- Hiring Patterns of manpower
- Skill identification of existing manpower employed in the industry
- HR hiring pattern in the industry at present
- Disruptive Technologies arriving in the industry and impact on manpower engaging model

All this has been recorded and cumulative analysis has been given in subsequent slides

INDIAN STEEL SCENARIO

- Rapid rise in production has resulted in India becoming the 2nd largest producer of crude steel during 2018.
- The present capacity of Crude Steel Production is 142.42 MT and slated to grow to 300 MT by 2030-31
- The country is also the largest producer of Sponge Iron or DRI in the world and the 3rd largest finished steel consumer in the world after China & USA.
- Government's role is that of a facilitator which lays down the policy guidelines and establishes the institutional mechanism/structure for creating conducive environment for improving efficiency and performance of the steel sector.
- Government has released the National Steel Policy 2017, which has laid down the broad roadmap for encouraging long term growth for the Indian steel industry, both on demand and supply sides, by 2030-31.
- The Government has also announced a policy for providing preference to domestically manufactured Iron & Steel products in Government procurement.

Source - Joint Plant Committee (JPC), Ministry of Steel which a committee under Ministry of Steel for supporting steel plants and streamlining issues of Indian Steel Industry

STEEL PRODUCTION PROCESS ROUTES

In India Steel is produced through following routes in the Year 2018-2019:

- a) BF - BOF
- b) Electric Arc Furnace
- c) Induction Furnace

Production Route	No of Units	Working Units	Inst Cap, mT	Working Cap, mT	Prod, mT
BOF	17	17	56.795	56.795	49.455
EAF	54	48	41.69	41.464	28.476
IF	1074	912	48.801	43.977	32.99
Total			147.286	142.236	110.921

mT – Million Tonne

Source – JPC, Annual Report - 2018-19

SECTORS AND SUBSECTORS OF IRON AND STEEL INDUSTRY

Indian Iron and Steel Sector is mainly comprising of Primary Steel Sector (Integrated Steel Plants) and Secondary Steel Sector (EAF, IF Route) with sub sectors such as Sponge Iron, Rerolling etc. The sectors and subsectors are:

- Integrated Steel Plants
- Steel plants based on EAF
- Induction furnace-based plants
- Sponge iron making units - Direct Reduction Process
- Rerolling mills
- Foundries

PRODUCTION CAP. MAJOR IRON AND STEEL STATES IN INDIA- 2018-2019

DIRECT STUDY STATES

Steel Production Capacity - Odisha					
	No of Units	Working units	Inst Cap, mT	Working Cap, mT	Prod., mT
BOF	4	4	11.4	26.42	19.30
EAF	9	8	11.394		
IF	61	51	4.493		
Total	74	63	27.287		

Steel Production Capacity - Chhattisgarh					
	No of Units	Working units	Inst Cap, mT	Working Cap, mT	Prod., mT
BOF	1	1	5.5	18.064	13.164
EAF	6	5	6.327		
IF	84	70	6.774		
Total	91	76	18.601		

Steel Production Capacity - Jharkhand					
	No of Units	Working units	Inst Cap, mT	Working Cap, mT	Prod., mT
BOF	3	3	16.477	19.415	17.238
EAF	3	2	1.024		
IF	74	60	2.086		
Total	80	65	19.587		

Steel Production Capacity - West Bengal					
	No of Units	Working units	Inst Cap, mT	Working Cap, mT	Prod., mT
BOF	2	2	4.7	10.82	7.471
EAF	8	8	1.014		
IF	69	41	5.696		
Total	79	51	11.41		

52% steel is produced in these 4 states of India

PRESENT MANPOWER ENGAGED FOR STEEL PRODUCTION

As per direct Study and JPC Reports to Ministry of Steel typical manpower required for Crude Steel production is under various processes is as mentioned below

S. No	Production Process/Route	Present Technical Manpower/MT
1	Integrated Steel Plant – (BF-BOF)	3500
2	EAF-LF-CC – Steel Plants	400
3	IF-CC based Steel Plants	2000
4	Sponge Iron Plants - DRI	700
5	Re-rolling	3000

	Present Technical Manpower/MT	Working Cap, mT	Consolidated Manpower
DRI	700	46.55	33000
BOF - ISP	3500	56.79	199000
EAF	400	41.46	17000
IF	2000	43.97	88000
Rerolling	3000	73.61	220000

MANPOWER ASSUMPTIONS IN CRUDE STEEL PRODUCTION PER MT

S. No	Production Route	Present Technical Manpower/MT	Future Technical Manpower/MT
1	Integrated Steel Plant	3500	1500
2	EAF-LF-CC – Steel Plants	400	300
3	IF-CC based Steel Plants	2000	1400
4	Sponge Iron Plants	700	500
5	Re-rolling	3000	2500

Sources – NISST Analysis based on industry interactions

Note: The need for technical manpower in the next decade would be dependent on new technology (Industry 4.0), innovative practices in steel plant operation, latest increased automation management strategies that would emphasise higher productivity, Efficiency and sustainability.

MANPOWER ASSUMPTIONS OF FOUNDRY AND FERRO ALLOYS

Foundry

1. The foundry sector is highly labour intensive & currently generates employment for 2 Million directly & indirectly mainly from socially & economically weaker sections of society
2. >7.5% YoY as per forecasts of leading International Institutions.
3. potential to generate additional employment of 2 Million in next 10 years. Out of this 25% would be direct employment i.e. 5 Lakh people

Ferro-Alloys

1. Present Capacity 5.15 MT
2. Ferro Alloys needed as per NSP 2017. 4.0 MT by 2030-31
3. Considering 2.5 MT for exports, total is requirement expected is 6.5 MT
4. Capacity needed would be 7.65 MT at 85% capacity utilization
5. New Capacity needed would be 2.50 MT
6. Technical Manpower needed would be 6250 for additional 2.5 MT, as about 2500 technical persons are required for 1 MT ferro alloys production.

INCREMENTAL MANPOWER REQUIREMENT IN SECTOR BY 2030-31

S. No	Sectoral	Number
1	Crude Steel Production with DRI and Rolling subsectors	3,97,860
2	Foundry	5,00,000
3	Ferro Alloys	6,250
4	Requirement of Overseas for skilled jobs in Iron and Steel related Trades (Welder, fitter, machinist etc)	1,50,000
		10,54,110

Sources – NISST Analysis

NUMBERS FOR SKILL GAPS BY 2030-31

S. No	Manpower	Areas	Number
1	Skill upgradation and reskilling	Crude Steel	3,37,000
		Production	
		Rerolling	2,20,000
		Foundry	2,50,000
		Ferro Alloys	6,438
2	Fresh Trainings and hiring under various employment models and apprenticeships	Crude Steel	
		Production	3,97,860
		Foundry	5,00,000
		Ferro Alloys	6250
		Over Seas	1,50,000
			18,67,550

Assumptions:

1. 50% of existing manpower needs skill upgradation due to change in technology, redeployment and multiskilling

THEMATIC JOB ROLES/TRADES/ OCCUPATION

Other job roles indicated against major occupation

Job Roles, Trades, Occupations	BF-BOF	EAF	IF	Re - Rolling	DRI
Raw material handling/Others					
Mobile Equipment Operations and Maintenance	✓	✓		✓	✓
Dumper Operator	✓				✓
Locomotive Driver	✓				✓
Stacker and Reclaimer	✓				✓
Excavator Operator	✓				
Shunting Operator	✓				
Wagon Loading and Unloading	✓				✓
Screen & Crusher Operator	✓				✓
Marker & Signage Painter	✓	✓	✓	✓	✓
Marking and Packaging	✓	✓	✓	✓	✓
Housekeeping	✓	✓	✓	✓	✓
Refractory Brick Layer	✓	✓			
Conveyor Belt Operations and Maintenance	✓	✓			✓

- **Present Skill Supply Ecosystem:**
 - ITI Ecosystem
 - PMKVYs and PMKKs

Total ITIs in India	13,105
Government ITIs:	2,293
Private ITIs	10,812
Total trades in ITIs	150+
Number of trades which can be categorized under the Iron and Steel Sector:	40
Total seat count in ITIs for all trades:	3.4 million
Total seat count for manufacturing trades	1.4 million
1. Seat count for Iron and Steel Sector trades	0.20 million
2. Seat count for other manufacturing trades (relevant to the Iron and Steel Industry industry)	1.18 million

Note: There is not any significant gap in demand and supply of Technical Manpower in Iron and steel sector. However, industry feels there is a large skill Gap in the total eco system for the sector which is increasing.

TRADE UNITS
AND NO OF
ITIS
ASSOCIATED
WITH TRADES
ALIGNED
WITH IRON
AND STEEL
SECTOR

S.No	Trade	Number of Units	Number of ITIs	
			Government	Private
1	Attendant Operator (Chemical Plant)	72	42	10
2	Attendant Operator (Chemical Plant)	7	4	0
3	Mechanic Communication Equipment Maintenance	4	1	2
4	Carpenter	563	379	91
5	Driver Cum Mechanic (Light Motor Vehicle)	238	111	76
6	Draughtsman (Mechanical)	976	285	337
7	Draughtsman (Civil)	2243	504	882
8	Electrician	25609	1686	9526
9	Electroplater	30	22	1
10	Foundryman	180	117	6
11	Farm Mech. Agri. Mechanic	5	4	0
12	Fitter	21196	1722	8443
13	Instrument Mechanic (Chemical Plant)	41	16	6
14	Instrument Mechanic (Chemical Plant)	15	10	2
15	Instrument Mechanic	372	178	56
16	Information Technology & Electronics System Maint.	573	281	126
17	Mechanic Repair & Maintenance of Light Vehicle	21	8	7
18	Mechanic Auto Electrical & Electronics	61	18	29
19	Mechanic Agricultural Machinery	25	21	1
20	Machinist (Grinder)	251	110	18
21	Machinist 1263	1263	442	84
22	MCP	134	33	59

TRADE UNITS
AND NO OF
ITIS
ASSOCIATED
WITH TRADES
ALIGNED
WITH IRON
AND STEEL
SECTOR

S.No	Trade	Number of Units	Number of ITIs	
			Government	Private
23	Mechanic-cum-Operator Electronic Communication System	22	5	7
24	Mechanic (General Electronics)	15	4	3
25	Moulder	87	54	2
26	Mechanic Maintenance (Chemical Plant)	38	21	6
27	Mechanic (Marine Diesel)	11	2	2
28	Mechanic (Motor Vehicle) 3224	3224	888	945
29	Mechanic Mechatronics 9	9	4	0
30	Mechanic Machine Tool Maintenance	114	70	6
31	Operator Advanced Machine Tool	5	4	1
32	Pump Operator-Cum-Mechanic	115	95	10
33	Painter (General)	272	166	69
34	Plastic Processing Operator	159	117	10
35	Pattern Maker	71	55	1
36	Sheet Metal Worker	357	235	49
37	Tool & Die Maker (Dies & Moulds)	32	18	6
38	Tool & Die Maker (Press Tools, Jig & Fixture)	66	35	7
39	Tool & Die Maker	72	35	10
40	Turner	1925	586	236
41	Welder (Gas & Electric)	1749	662	421
42	Welder	2097	647	823
43	Wireless Mechanic cum Operator	20	14	1
44	Wireman	2476	1021	589

PRESENT HIRING PATTERNS

A. Formal Training programs:.

1. The hiring percentage of large companies from such programs is close to 70-80 percent.
2. SMEs this has only a minor source of new hiring. The primary reason being that typically SMEs are more constrained in their approach to manpower planning

B. From open source hiring and competitions: The other major source of hiring a trade worker is from competitors from within or outside the sector. This mode of sourcing new employment constitutes approximately 60-70 percent in SMEs hiring. However, for large companies the percentage remains low in 10-20 percent range.

C. Internal job rotations or promotions: This mode of new skill sourcing constitutes minority percentage among both large companies and SMEs. The reliance on channels of recruitment other than fresher recruitment from education and training institutions

D. Potential Sources of Manpower are Industrial Training Institutions, experienced hires from competitors, confirming apprentices to jobs and other sources

TRAINING REQUIREMENTS OF EMPLOYEES

Constant up-skilling of the employees has been deemed as a critical area of workforce management by participating employers. The important insights on the training requirements of existing employees as gathered from the primary interviews are as follows:

- Most preferred mode
- Training content
- Training expenditure and hours

CURRENT SKILL GAPS, FUTURE INDUSTRY ASPIRATIONS

Eco-system is constituted by four main stakeholder groups, i.e.:

- The individuals who get trained for employment
- The present education and vocational training system leading to skilled jobs and employment
- Industry concentrating on skilled manpower for getting work done.

The present skill gap can be defined as following in terms inputs and outputs of industry and education ecosystem:

a) Due to gap between Industry and academia:

Some of the potential issues are:

1. Non responsiveness from academia to industry needs
2. Courses not aligned to candidate expectation and job needs
3. Trainer Quality
4. Training infrastructure Quality

CURRENT SKILL GAPS, FUTURE INDUSTRY ASPIRATIONS

On the job trainings

- Some of the potential issues are:
- Planning of workforce for expansions and projects
- On the job trainings and skill identification
- Job designing by industry
- Working issues with industry and academia
- Industry reluctant to offer recognition and incentivise the skilled manpower

Individual entering the industry without being skilled

- a. Where individual needs a job for sustainability but does find a value to skills
- b. It is the rational response chosen by individuals to either an education and training system that makes the training investment unattractive, or firms' workforce management policies which dilute the requirement for education and training

FUTURE ASPIRATION FROM INDUSTRY

- Multi-skilled employees
- Operator as Maintenance Technician
- Computer/ ITskills-based job-roles to increase
- Demand for Innovation and design roles to increase
- Demand for competent managers to increase
- Flexibility in hiring
- Decrease labour costs
- Flexible and motivated Employees

SKILLS GAPS AT TRAINING ECOSYSTEM

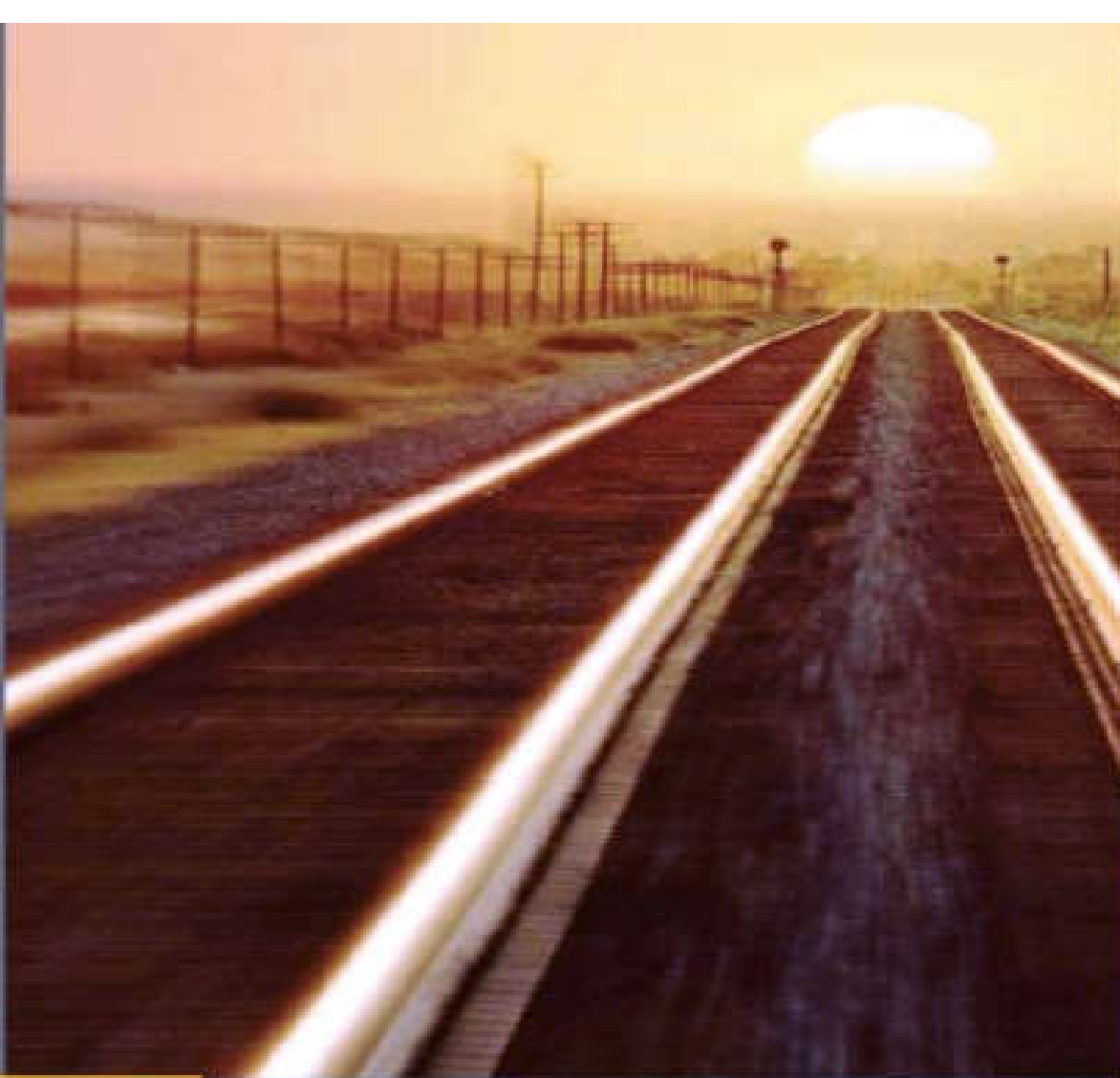
- Poor employment selection by industry
- Training Dropouts
 - Financial issues
 - Some quick job opportunity elsewhere
 - Admission in some poly technical course or engineering course
 - Difficulty in understanding the course
 - Disinterest in the trade
- Underutilization of capacity due to poor perception of trades
- Unavailability of enough funds for trainings
- Good , Qualified and trained Trainers

RECOMMENDATIONS FOR ACADEMIA

- Collaborate with industries
- Strengthening the industry-training system linkages
- Trainer and Assessor framework and Network
- Developing a Learning Management System (LMS) for digital learning
- Job Roles/National Occupational Standards and training curricula as per industry need
- Industry associations to increase membership and participation in the SSC activities
- Identification of target manpower as per trade and job roles for trainings

RECOMMENDATIONS FOR INDUSTRY

- Create collaborative learning ecosystems
- Support Academia with latest knowhow of production processes
- Support IISSTC in creating relevant job roles
- Curriculum Development
- Develop workforce re-training programs across organizational levels
- Work in close partnership with the government to ensure success of its efforts to take advantage of Skill India Mission
- Industry needs to contribute towards the goal of creating future ready skilled manpower
 - Partner in revamping PMKKs, PMKVYs, ITIs and other skill development institutions infrastructure
 - Partnering with respective government department and agencies towards a more conducive skill policy and deployment planning
 - Conduct faculty immersion programs to provide faculty with shop-floor experience.
 - Deploy robust apprentice programs, with focus on learning outcomes during apprenticeship.



Thank You